

### Claims

1                    1.    A mixing valve which receives fluid from a  
2                    first source and fluid from a second source and outputs a  
3                    mixture of the fluids, the mixing valve comprising:  
4                    a valve body comprising:  
5                           a first fluid inlet;  
6                           a first fluid chamber in fluid communication  
7                    with the first fluid inlet;  
8                           a second fluid inlet;  
9                           a second fluid chamber in fluid  
10                   communication with the second fluid inlet;  
11                          a mixing chamber in fluid communication with  
12                   the first fluid chamber and the second fluid  
13                   chamber; and  
14                          a fluid outlet in fluid communication with  
15                   the mixing chamber;  
16                          a fluid flow regulator mounted within said  
17                   housing between said first fluid chamber and said second  
18                   fluid chamber, wherein a lower surface of said fluid flow  
19                   regulator is disposed within said first fluid chamber and an  
20                   upper surface of said fluid flow regulator is disposed  
21                   within said second fluid chamber, said fluid flow regulator  
22                   being mounted within said valve body in such a way as to  
23                   permit movement of said fluid flow regulator along a  
24                   longitudinal axis of said valve body, said fluid flow  
25                   regulator having apertures therein which permit a flow of  
26                   fluid between said second fluid chamber and said mixing  
27                   chamber, said fluid flow regulator including a central hub

28 which extends below said lower surface into said mixing  
29 chamber;

30 ~~a temperature-sensing device~~ mounted to said  
31 central hub of said fluid flow regulator, said temperature-  
32 sensing device including a cup portion disposed proximate  
33 said mixing chamber and a piston which extends through said  
34 central hub of said fluid flow regulator and into engagement  
35 with an adjustably fixed surface of an adjustment device of  
36 the mixing valve, the adjustment device being mounted to  
37 said valve body of said mixing valve, said cup portion being  
38 constructed and arranged for sensing a temperature of fluid  
39 which flows from said mixing chamber to said outlet, causing  
40 said piston to extend from said temperature-sensing device  
41 in response to an increase in temperature and causing said  
42 piston to retract into said temperature-sensing device in  
43 response to a decrease in temperature; and

44 a bias spring mounted between said valve housing  
45 and said temperature-sensing device which biases said  
46 temperature-sensing device against said adjustably fixed  
47 surface of the adjustment device;

48 wherein, when the temperature of fluid passing  
49 from said mixing chamber over the cup increases, said  
50 temperature-sensing device moves said fluid flow regulator  
51 downward to limit the flow of fluid from said first fluid  
52 chamber to said mixing chamber and increase the flow of  
53 fluid from said second fluid chamber to said mixing chamber,  
54 and when the temperature of fluid passing from said mixing  
55 chamber over the cup decreases, said temperature-sensing  
56 device moves said fluid flow regulator upward to limit the

57 flow of fluid from said second fluid chamber to said mixing  
58 chamber and increase the flow of fluid from said first fluid  
59 chamber to said mixing chamber, thereby causing fluid  
60 flowing from said fluid outlet to remain close to a preset  
61 temperature which is set by the adjustment device.

1 2. The mixing valve of claim 1, further  
2 comprising a diffuser mounted between said bias spring and  
3 an annular ring of said temperature-sensing device, said  
4 diffuser being constructed and arranged for agitating said  
5 fluid as it passes from said mixing chamber into contact  
6 with said cup of said temperature-sensing device.

1 3. The mixing valve of claim 2, wherein said  
2 diffuser includes an annular peripheral wall and an annular  
3 plate which extends radially inwardly from said peripheral  
4 wall to form an aperture within which said cup of said  
5 temperature-sensing device is disposed, wherein fluid  
6 flowing from said mixing chamber into said diffuser is  
7 agitated and directed toward said cup through said aperture  
8 in said annular plate of said diffuser.

1 4. The mixing valve of claim 3, said diffuser  
2 further comprising a number of fins which extend radially  
3 inward from said peripheral wall of said diffuser.

1 5. The mixing valve of claim 3, wherein said  
2 bias spring is constructed and arranged to contact said  
3 diffuser proximate said peripheral wall, so as to not

4 interfere with fluid as it flows from said diffuser and into  
5 contact with said cup of said temperature-sensing device.

1 6. A mixing valve which receives fluid from a  
2 first source and fluid from a second source and outputs a  
3 mixture of the fluids, the mixing valve comprising:

4 a valve body comprising:

5 a first fluid inlet;

6 a first fluid chamber in fluid communication  
7 with the first fluid inlet;

8 a second fluid inlet;

9 a second fluid chamber in fluid  
10 communication with the second fluid inlet;

11 a mixing chamber in fluid communication with  
12 the first fluid chamber and the  
13 second fluid chamber; and

14 a fluid outlet in fluid communication with  
15 the mixing chamber;

16 a fluid flow regulator mounted within said  
17 housing between said first fluid chamber and said second  
18 fluid chamber, wherein a lower surface of said fluid flow  
19 regulator is disposed within said first fluid chamber and an  
20 upper surface of said fluid flow regulator is disposed  
21 within said second fluid chamber, said fluid flow regulator  
22 being mounted within said valve body in such a way as to  
23 permit movement of said fluid flow regulator along a  
24 longitudinal axis of said valve body, said fluid flow  
25 regulator having apertures therein which permit a flow of

26 fluid between said second fluid chamber and said mixing  
27 chamber, said fluid flow regulator including a central hub;  
28 a temperature-sensing device mounted to said  
29 central hub of said fluid flow regulator, said temperature-  
30 sensing device including a cup portion disposed proximate  
31 said mixing chamber and a piston which extends through said  
32 central hub of said fluid flow regulator and into engagement  
33 with an adjustably fixed surface of an adjustment device of  
34 the mixing valve, the adjustment device being mounted to  
35 said valve body of said mixing valve, said cup portion being  
36 constructed and arranged for sensing a temperature of fluid  
37 which flows from said mixing chamber to said outlet, causing  
38 said piston to extend from said temperature-sensing device  
39 in response to an increase in temperature and causing said  
40 piston to retract into said temperature-sensing device in  
41 response to a decrease in temperature;  
42 a bias spring mounted between said valve housing  
43 and said temperature-sensing device which biases said  
44 temperature-sensing device against said adjustably fixed  
45 surface of the adjustment device; and  
46 a diffuser mounted between said bias spring and  
47 an annular ring of said temperature-sensing device, said  
48 diffuser being constructed and arranged for agitating said  
49 fluid as it passes from said mixing chamber into contact  
50 with said cup of said temperature-sensing device;  
51 wherein, when the temperature of fluid passing  
52 from said mixing chamber over the cup increases, said  
53 temperature-sensing device moves said fluid flow regulator  
54 downward to limit the flow of fluid from said first fluid

55 chamber to said mixing chamber and increase the flow of  
56 fluid from said second fluid chamber to said mixing chamber,  
57 and when the temperature of fluid passing from said mixing  
58 chamber over the cup decreases, said temperature-sensing  
59 device moves said fluid flow regulator upward to limit the  
60 flow of fluid from said second fluid chamber to said mixing  
61 chamber and increase the flow of fluid from said first fluid  
62 chamber to said mixing chamber, thereby causing fluid  
63 flowing from said fluid outlet to remain close to a preset  
64 temperature which is set by the adjustment device.

1 7. The mixing valve of claim 6, wherein said  
2 central hub is constructed and arranged to extend below said  
3 lower surface into said mixing chamber.

1 8. The mixing valve of claim 6, wherein said  
2 diffuser includes an annular peripheral wall and an annular  
3 plate which extends radially inwardly from said peripheral  
4 wall to form an aperture within which said cup of said  
5 temperature-sensing device is disposed, wherein fluid  
6 flowing from said mixing chamber into said diffuser is  
7 agitated and directed toward said cup through said aperture  
8 in said annular plate of said diffuser.

1 9. The mixing valve of claim 8, said diffuser  
2 further comprising a number of fins which extend radially  
3 inward from said peripheral wall of said diffuser.

1                    10. The mixing valve of claim 8, wherein said  
2 bias spring is constructed and arranged to contact said  
3 diffuser proximate said peripheral wall, so as to not  
4 interfere with fluid as it flows from said diffuser and into  
5 contact with said cup of said temperature-sensing device.